

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars:

Objection to the drawings

Figs. 4, 6a, and 6b are shown in the "Replacement Sheets" of drawing appended herewith. Fig. 4 has been revised to show cross-hatching. Fig. 6 has been replaced by Figs. 6a and 6b, wherein Fig. 6b shows the detail indicated on Fig. 6a.

In view of the revised drawings, withdrawal of the drawing objections is requested.

Objections to the specification

The specification is presently objected to for certain informalities. In particular, the examiner notes that an abstract is missing. Also, the examiner has identified minor typographical or grammatical errors in the specification. Further, the examiner has stated that the title of the invention is not descriptive.

An abstract is provided herewith. Also, the specification is amended to correct typographical and grammatical errors, including those identified by the examiner and others identified by the applicant.

Further, the title is changed to read "A Multilayer bellows Seal and a Method for Producing a Multilayer Bellows Seal." It is respectfully submitted that the title is clearly indicative of the invention to which the claims are directed.

In view of the present amendment, withdrawal of these objections is requested.

Also in the specification, the list of figures is amended to reflect the replacement of Fig. 6 with Figs. 6a and 6b.

In the claims

The pending set of claims 31 – 63 has been canceled, and new claims 64 – 89 have been added. Claims 64 – 74 are directed to a “method of producing a multilayer bellows seal,” and claims 75 – 89 are directed to “a multilayer bellows seal.”

Support for this amendment can be found in the specification at page 1, lines 12 – 15 and in Figures 3, 6 and 8.

Rejection of claims 31-38, 43-52, and 58-63 under 35 U.S.C. § 112, second paragraph

Claims 31-38, 43-52, and 58-63 presently stand rejected as being indefinite. It is respectfully submitted that the cancellation of claims 31 – 63 has rendered the present rejection moot.

Applicant notes that new claim 64 (an independent claim generally corresponding to cancelled claim 31 and directed to a method of producing a seal) includes two further steps according to which said sheets are submitted to a shaping step to obtain corresponding hollow cylindrical bodies and the obtained hollow cylindrical bodies are placed inside one another, so as to superimpose said sheets. Moreover, claim 64 recites that at least a first and a second of said sheets are placed into close mutual contact so that said at least one face with said channel in said first sheet faces said second sheet, thus defining a volume confined between said first and said second sheet.

Also, new claim 75 (an independent claim generally corresponding to cancelled claim 46 and directed to a seal) is drafted to more clearly express that at least one face of the first layer facing the second layer has at least one channel, thus defining a volume confined between the first and the second sheet.

Applicant submits that the remaining claims, to the extent that they correspond to, or include limitations corresponding to those of, the cancelled claims 31-63, have been drafted in view of the indefiniteness issues identified by the examiner.

In view of the cancellation of claims 31 – 63 and the addition of new claims 64 – 89, withdrawal of this rejection is requested.

Rejection of claims 31-63

Claims 31-63 presently stand rejected as being anticipated by Roach et al (U.S. 5,072,622) (claims 46-48 and 61) or as being unpatentable over Roach in view of additionally cited references (Owen (U.S. 3,472,062), Thoma (EP 945 658 A1), Lichtenberger (U.S. 2,691,773), Ford (U.S. 2,170,015), and Tanaka (JP 59-232627)) in various combinations.

In particular, independent claim 31 (directed to a method of producing a multilayer seal) is rejected as being unpatentable over Roach in view of Ford and Tanaka, while independent claim 46 (directed to a multilayer seal) is rejected as being anticipated by Roach.

Applicant submits that cancellation of claims 31-63 has rendered the present rejection moot.

New claims 64 – 89

New claims 64-89 have been added, wherein claims 64 – 74 are directed to a “method of producing a multilayer bellows seal,” and claims 75 – 89 are directed to “a multilayer bellows seal.” Claims 64 and 75 are independent claims, and claims 65-74 and 76-89 depend from claims 64 and 75, respectively.

It is respectfully submitted that claims 64-89 are allowable over the cited references, for at least the following reasons.

Claims 64-89 are directed to a multilayer bellows seal which is not taught or suggested by any of Roach, Owen, Thoma, Lichtenberger, Ford, Tanaka or any reasonable combination thereof.

The present invention is directed to a diaphragm or bellows, and more particularly to a flexible, corrugated bellows.

Roach is not directed to a flexible, corrugated bellows. On the contrary, Roach pertains to a pipe or a conduit, and more particularly to a rigid pipe or conduit.

Roach notes that “a preferred embodiment [...] comprises a lined pipe section 10” (Roach; col. 3, lines 45-46). Thus, while the examiner asserts that “Roach et al. disclose a multilayer seal (10),” it is clear that Roach’s “lined pipe section 10” does not disclose or suggest a seal at all, but simply a lined pipe section.

Roach provides that “flanges 22 are provided at each of the ends 24, 26 of the lined pipe section to allow connection to a sealing flange 28 and to a flange 30 of an adjacent pipe section 32” (Roach; col. 3, lines 54-57).

Roach further states that “the liner 16 shown in FIG. 3 may be made of a single resin with desirable physical properties to both bridge and seal a hole or leak in the outer pipe 14” (Roach; col. 4, lines 38-40). Moreover, “in a particularly preferred embodiment of the invention, it is desired that if a leak or hole in the exterior pipe FIG. 1 #14 occurs, the liner will bridge such leak or hole” (Roach; col. 5, lines 22-25).

Thus, even assuming, *arguendo*, that Roach’s liner 16 may itself be construed to be a seal (although clearly not a multilayer bellows seal) Roach provides no teaching or suggestion that the liner 16 and the outer pipe 14 together form a seal or a multilayer seal or a multilayer bellows seal. On the contrary, only the liner 16 can be construed to function in any way as a seal, for the expressed purpose of bridging a leak or hole in the outer pipe 14.

Therefore, the pipe 14 and the liner 16 do not, together, form a seal or a multilayer seal.

The technical improvement possessed by the presently claimed invention is that of applying a system of channels to a flexible, corrugated bellows seal, which is a rather different product with respect to a rigid pipe, a bellows being able to follow the movement of the respective ends thus varying its own length. Accordingly, the present invention is not even remotely suggested by Roach, which is not directed to bellows seal.

Therefore, the presently claimed invention is not anticipated by Roach.

Among the additionally cited documents, Owen and Thoma pertain to a bellows seal, and Lichtenberger pertains to a plug valve provided with a bellows seal.

However, the presently claimed invention is distinguished from Owen, Thoma and Lichtenberger (these latter two being already cited in the specification of the present application).

In particular, each of these documents disclose bellows seals comprising a first flexible member and a second flexible member *spaced apart* from each other to form a chamber there-between. Owen states that "a multiple ply bellows is provided having means for evacuating or applying pressure to the sealed space between the plies of the bellows" (Owen; col. 1, lines 13-15). To the extent that Thoma illustrates a multiple ply bellows, Thoma's Fig. 4 appears to show an arrangement for providing a fluid to an interstitial space between plies of the bellows. Lichtenberger clearly shows, in Fig. 1, an outer bellows 18 and an inner bellows 23 defining a completely enclosed volume 24 there-between.

The drawbacks associated with the presence of a chamber between the layers of a seal have already been broadly discussed in the specification of the present application (see pages 2-3 of the present specification).

According to the presently claimed invention, once at least a channel (3) has been formed on at least one of the sheets forming the bellows layer, said sheets are placed "into close *mutual contact* so that said at least one face with said channel in said first sheet faces said second sheet" (emphasis added).

This leads to a result completely different from (and substantially contrary to) any result obtainable from the teachings of Owen, Thoma or Lichtenberger. Moreover, any such modification of Owen, Thoma or Lichtenberger (such as to eliminate a chamber or space between bellows layers) would go against their respective teachings and render each unsatisfactory for their intended purpose, or would change their principle of operation, since each relies in some manner on the chamber or space.

Accordingly, there is no motivation or suggestion for combination of Reese with any of Owen, Thoma, or Lichtenberger. Reese does not disclose or suggest a multilayer

seal or any form of bellows seal. There is no motivation or suggestion to modify Reese in view of a multilayer bellows seal or any other bellows structure.

A person skilled in the art (of *pipeline* monitoring as taught by Reese) would simply have no reason to turn to any form of bellows, including those taught by Owen, Thoma and Lichtenberger.

It is noteworthy that Reese is classified in U.S. Cl. 73/40.5 R (MEASURING AND TESTING - Fluid handling conduit in situ), while the present application is differently classified (as indicated on the published application) in U.S. Cl. 277/634 (SEAL FOR A JOINT OR JUNCTURE - Flexible sleeve, boot, or diaphragm).

Accordingly, it is respectfully submitted that there is no motivation or suggestion to employ or modify Reese in a manner to arrive at the presently claimed invention, since Reese lies in a different field.

For at least the above reasons, it is respectfully submitted that new claims 64-89 are allowable over the cited references.

#### Conclusion

In view of the amendments to the claims, and in further view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is requested that claims 64-89 be allowed and the application be passed to issue.


Application No.: 10/516,305  
Examiner: Gay Spahn  
Art Unit: 3673

If any issues remain that may be resolved by a telephone or facsimile communication with the Applicant's attorney, the Examiner is invited to contact the undersigned at the numbers shown.

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Date: January 18, 2007

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